

Social Dynamics and Self-Organizing

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Abstract

A view of dynamics and self-organizing of social systems is presented. Both a separate Homo sapiens and human society are viewed as social systems. The dynamics of the development of such systems is also examined.

1. Introduction

The processes of self-organizing are of great importance for the evolution of social systems. Self-organizing is the process of dynamic reconstruction of an organism or a social system on purpose to adapt to the outer environment. Self-organizing on the level of the separate organism is performed by means of training and as a result there is dynamic reconstruction of neural structures of the head brain. Self-organizing on the level of the social system is realized by means of interaction between the system elements and the outer environment; as a result there is dynamic reconstruction of the connections between the organisms. The processes of dynamics and self-organizing are greatly influenced by the connections imposed on the individual from the side of the society (the organization of the society, religion, morals, etc.). The theoretic ground of the process of self-organizing was developed by I. Prigogin [1-3]. According to him the process of self-organizing takes place in nonequilibrium conditions the source of which are different fluctuations. When the fluctuations exceed some critical point (the point of bifurcation) the system begins its development to a new state. It is impossible to predict the further development of the system in the locality area of the point of bifurcation. It is determined by chance factors. When the choice of the direction has been made, chance gives up its seat to the determined way of development. Such a process is typical of physical systems and doesn't always reflect adequately the dynamics of social systems. In this paper the dynamics of social systems is examined and the conclusion is made that in the process of development of the social system the bifurcation

approach will more give in to the process of smooth transition to a new quality. The process of changing of entropy of social systems is also being analyzed. Self-organizing of the separate organism is deeply examined.

2. Self-organizing of social systems

Let's examine the evolution and self-organizing of higher biological systems on the level of human society. Homo sapiens are considered to be the component of such a system. In comparison with other organisms Homo sapiens has high level of intelligence and mind, which characterizes his ability for cognition and understanding, for purposive and conscious activity. The individuals are situated there on more high stage of differentiation (more distinguishable): each of them has his own level of development, character, experience and history, i.e. the things, which form his individuality. The evolution of higher biological systems depends on the connections, which exist within the system (the organization of the society). It also depends on the level of development and interaction of its components, historical past and the influence of the outer environment. The connections of the system limit the degree of freedom of its elements and reflect the structure of the society. The interaction and development of both the components and the whole system depend on the connections. The entropy of the separate system may alter according to oscillatory law preserving in the globally the tendency to diminution. Chaotic state of the society (crisis, civil war) or hierarchical organization of the society with rigid connections may serve as an example of increase of the entropy of the biological system in the process of its development. Such organization has its roots in the idea of ancient Greek philosopher Aristotel about natural hierarchy and it is characterized by monodirection of the connections (from top to bottom). Here in fact, the connections limit the degree of freedom of the system components and neutralize the process of collective behavior that is

able to reflect the system to more high levels of organization. In physics the crystals in which the molecules are forged by connections are considered to be the analogy of such an organization of the society. The structure of the crystal is inert and in case of isolation such a state may exist for a very long period of time. Social systems are open and this assists their transformation in time on the purpose to adapt to the outer environment. Different kinds of fluctuations may appear in the process of functioning of the biological system because of influences of inner and outer environment. These fluctuations lead to the formation of local areas of nonequilibriumness. This assists partial disadaptation of the system, which it strives to neutralize. By this in the system with flexible connections there is their reconstruction to compensate the nonequilibriumness and the system with rigid connections tries to push out the nonequilibriumness as a foreign body. Let's call the system stable if it is able to neutralize disadaptation with outer and inner world by means of development and self-organizing. The given definition presupposes not only passive adaptation in the frame of local reconstruction of previous connections, but also active reconstruction of the structures of the system. Social systems in which the arrow of development in a certain period of time is directed to more low stages of organization in comparison with the previous state may serve as an example of instability. The phenomenon of resonance is of great importance in the process of transformation of the fluctuation of the system and as a result of this the area of nonequilibriumness of the system broadens very quickly. A small nonequilibriumness echoes in the whole system and captures more and more of its components. It may play both a constructive role when it assists transformation of the system to more high level of organization and a destructive role in the opposite case. Disadaptation of the system, which is reflected on the components of the system, is considered to be the reason for resonance and if there is a coincidence with the inner disadaptation of individuals the chain reaction appears. In the process of broadening of the area of system nonequilibriumness there is a competition between fluctuations and connections of the system, which long for their neutralization. According to Hegel's dialectics the process of unity and struggle of the opposites takes place and it is considered to be the highest principle of development. The bigger the rigidness of the connections the more cruel the competition. As a result if the fluctuations capture a sufficient part of the system the area of indefiniteness appears (the surroundings of the point of bifurcation) which is characterized by the indefiniteness of the choice of further way of the development of the system [3]. In this area the

system may begin its development on different trajectories. So it can come back to the previous structure in a renewed state, it can also transfer to a new structure by means of self-organizing (of more high or low level) or it can fall into an unstable chaotic state till it meets with a new point of bifurcation. The system may stay in the area of indefiniteness for a long period of time. In such a state it is characterized by the fact that it becomes sensitive to little influences. And by this even an unimportant idea or action of the individual may strengthen itself to hypertrophy quantity and capture the whole system giving birth to the corresponding structure.

By this the idea must adequately reflect the state of the elements of the system, which depends on the reasons of disadaptation, historic experience and on the carrier of the idea. The more rigid the connections of the system the higher the probability of appearance of cataclysms during the process of transition to a new quality and on the contrary. Thus, in the area of indefiniteness the choice of the further route of development is determined in many ways by chance factors, for example, the presence of corresponding leaders that may use resonance for the realization of their ideas. After the direction of the development of the system has been chosen its behavior becomes more determined. The model of interaction of biological system with the outer environment is shown in fig. 1.6. According to [3] the play of bifurcation's of both the mechanisms of development and self-organizing of the system lies in the basis of the main mechanism of evolution. However probably in the process of development of the mankind as transition from more low to more high forms of organizations. This principle will more and more give in to the process of smooth (without cataclysms) transition to a new quality. Anyway there is a question: how did the mankind manage to escape from Permanent chaos in the globally ? Perhaps it happened owing to the ability for training and development, historic experience, instinct of self-preservation of the individuals and also owing to the universal values: religion, morals, etc. It is also possible to suppose that the evolutionary arrow of time is laid in the mankind. It is considered to be the transition to more high forms of organization and is closely connected with the evolution of the Universe. All this gives the ground to speak about the fact that there is the instinct of self-preservation in the mankind. Thus the chaotic state reflects the human society inadequately because it contradicts to the biological evolution as the increase of the degree of the organization of the system. At it has been already said above the rigidness of the connections in the system increases the probability of appearance of cataclysms during its evolution as an open system. The potential of

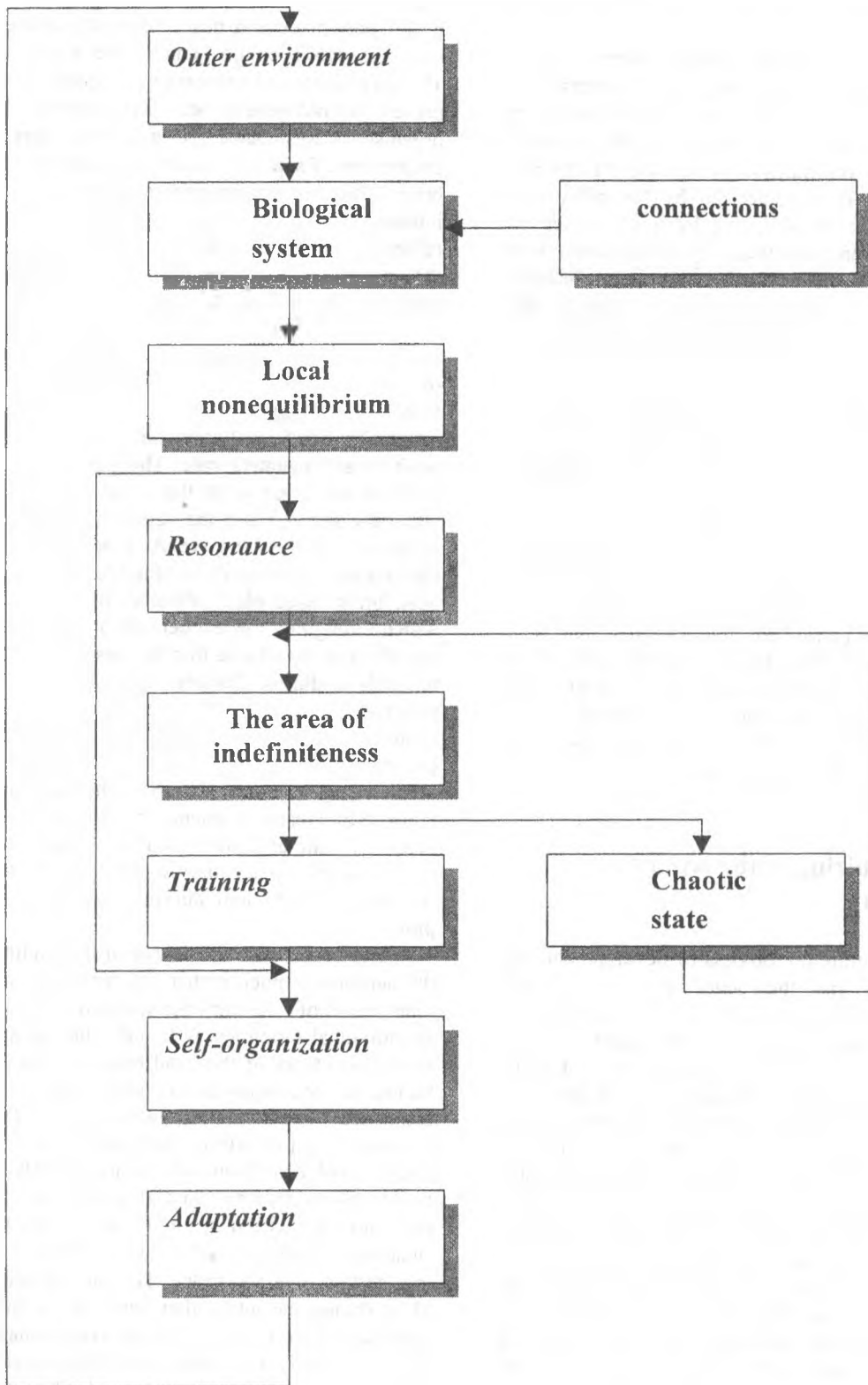


Fig. 1.6. The model of interaction between the biological system and the outer environment.

self-organizing must be laid in the system for its harmonic development.

Let's call a self-organizing system such a system, which is able in the process of interaction of its components with the outer environment to reconstruct its connections and give birth to a new organization on the purpose to develop effectively. Such a system is characterized by flexibility and presence of back connections, by great degree of freedom of its components and by different forms of their collective behavior. In this case the probability of destructive development of the system on the separate time stages diminishes. And by this the resonance assists the smooth reorganization of the system on the purpose to neutralize or disadapt.

Thus the Nonequilibrium State with outer and inner environment is considered to be the source of development of biological systems. Nonequilibrium state is the result of disadaptation of the system and it may generate the process of self-organizing during which the previous structure alters. Reorganization takes place with the help of natural means for self-organizing system (the principle of reorganization is laid in it) and is painful for hierarchical system with rigid connections. The deviation of the entropy of human civilization has an oscillating character and it has a tendency for diminution. In the globally as the historic experience shows human civilization is considered to be the stable system.

3. Self-organizing of the separate organism

Let's examine the process of development and self-organizing on the level of the separate individual who is considered to be the part of the higher biological system. Self-organizing is performed there by means of training and as a result there is a dynamic reconstruction of neural structures of the head brain and consequently the connections of the individual with other components of the system alter. This process constantly takes place and serves for adaptation of the organism to the outer and inner world. From the point of view of absolute knowledge a man stays all the time in the state of chaos (indefiniteness) which characterizes the degree of ignorance. In the process of cognition the size of indefiniteness decreases and in this sense the entropy also diminishes. The source of the development of the individual is represented by nonequilibrium condition with the outer and inner world, which appears as a result of influences from the outer environment. It brings to excitement of the corresponding neural structures of the head brain, which reconstruct themselves in such a way that the individual's behavior could neutralize the arisen

nonequilibriumness. Self-organizing of the head brain takes place and this arouses the alteration of the individual's connections in the social system. The phenomenon of resonance influences greatly the process of ontogenesis and self-organizing of the organisms. Resonance is a sharp increase of excitement of separate neural structures of the head brain. This excitement may appear as a result of interaction with the outer environment or as the effect of chemicals. The connections, imposed on the organism (inertionity of synapses, morals, self-preservation instinct, etc.) are considered to be the suppressing factor of resonance. The development of neural activity of the organism depends on the effect of competition between suppressing and stimulating factors. Resonance is one of the devices for adaptation of the organism and it may play both positive and negative role. The positive resonance leads to mobilization of the organism resources to attain the purpose and the negative resonance leads to stresses, depressions, etc. As a result of resonance the dynamic reconstruction of neural networks of the head brain takes place. Positive back connections, which strengthen the excitement of neural activity, are of great importance by this. Resonance may lead to insight during thinking operations when the solution of some problem has been found. For example, the recollections of some attributes connected with the image (name, profession) takes place during its identification. Identification will be realized by means of resonance if the input image is given only the attributes peculiar to him. The same processes take place during the solution of some complex problem and during some other creative processes.

But in this case the degree of the excitement of the neurons is much higher and may continue for a long period of time until the solution of the problem in individual's opinion is found. The inertionity of neural structures of the head brain is considered to be the limiting factor in this process. In the state of resonance even a small influence, if it reflects the reasons of neural activity adequately, may increase sharply and lead to insight. Consequently, chance factors play a great role in high creative processes of the individual because it is necessary that the fluctuation leading to insight was added to the object in a certain time and space. The same process takes place during the interaction between the individual and the system. If there is a negative resonance as it was said above, the excitement of the certain neural structures of the head brain may lead to neuroses, paralysis, schizophrenia, etc.

Affects serve there as a source of excitement. They may be aroused by different associations, for example, by a word. The process of increase of neural activity by means of positive back connections of neural structures may take place as a

result of competition between exciting and suppressing factors (according to Freud-censorship). By this on the analogy of the previous case the organism becomes very sensitive to some influences which are able to lead to catastrophic consequences. Thus, depressive factors may lead to the excitement of neural networks connected with these factors and also it may lead to neutralization of the censorship. Positive back connection strengthens this excitement and resonance takes place. In this state even small influence may arouse the instability of the organism and this is able to lead to suicide. We see that the chance factors also play great role there. In the state of resonance the behavior of the individual is difficult to predict. The same processes take place as a result of some other physic traumas. So amnesia and paralysis is one of the forms of adaptation of the organism and as a result there is the neutralization of the process of the increase of the excitement. Neutralization is performed with the help of blocking of the corresponding neural structures of the head brain, what arouses these diseases. This process was called "superseding" by S. Freud [4]. The traumas may disappear if there is a back process of disblocking. The disblocking of neural structures may be carried out both under hypnosis and by modeling of stress situations, which have lead to the trauma. According to one of Freud's postulates [4]

the thing which has been provoked by the consciousness may be removed by it.

Thus, self-organizing of the separate organism may lead to various consequences. The phenomenon of resonance and accompanying it chance factors play a great role by this.

The alteration of the entropy in the period of active organism's activity has an oscillating character and the entropy has a tendency to decrease. In the passive state when the neurons of head brain begin their liquidating the increase of entropy takes place and this increase attains the maximum value during the transition of the organism to the Quilibrium State with the outer world (the state of death).

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